

The following instructional plan is part of a GaDOE collection of Unit Frameworks, Performance Tasks, examples of Student Work, and Teacher Commentary. Many more GaDOE approved instructional plans are available by using the Search Standards feature located on [GeorgiaStandards.Org](http://GeorgiaStandards.Org).

## Georgia Performance Standards Framework for Mathematics – Grade 2

### **Unit 5 Organizer: “PARTS OF A WHOLE”** **(3 weeks)**

#### **OVERVIEW:**

In this unit students will:

- justify that the numerator is the top number of a fraction and that it represents how many parts of a set or whole;
- justify that the denominator is the bottom number of a fraction and that it represents the total objects of the set or the total parts of the whole;
- explain the concept that the larger the denominator, the smaller the size of the piece;
- compare simple fractions and tell why one fraction is greater than, less than, or equal to the other; and
- represent halves, thirds, fourths, sixths, eighths, and tenths using various fraction models.

Although the units in this instructional framework emphasize key standards and big ideas at specific times of the year, routine topics such as counting, time, money, positional words, patterns and tallying should be addressed on an ongoing basis through the use of calendar centers (tubs), and games. This first unit should establish these routines, allowing students to gradually understand the concept of number and time.

To assure that this unit is taught with the appropriate emphasis, depth, and rigor, it is important that the tasks listed under “Evidence of Learning” be reviewed early in the planning process. A variety of resources should be utilized to supplement, but not completely replace, the textbook. Textbooks not only provide much needed content information, but excellent learning activities as well. The tasks in these units illustrate the types of learning activities that should be utilized from a variety of sources.

#### **ENDURING UNDERSTANDINGS:**

- Fractional parts are equal shares of a whole or a whole set.
- The more equal sized pieces that form a whole, the smaller the pieces of the whole become.
- When the numerator and denominator are the same number, the fraction equals one whole.

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- When the wholes are the same size, the smaller the denominator, the pieces are larger.
- The fraction name (half, third, etc) indicated the number of equal parts in the whole.

### **ESSENTIAL QUESTIONS:**

- Why is it important to identify fractions (thirds, sixths, eighths, tenths) as representations of equal parts of a whole or of a set?
- Why is important to label fractions (thirds, sixths, eighths, tenths) as representations of equal parts of a whole or of a set?
- Why is it important to compare fractions (thirds, sixths, eighths, tenths) as representations of equal parts of a whole or of a set?
- What is a fraction?
- What do the parts of a fraction tell about its' numerator and denominator?
- If you have 2 fractions, how do you know which is greater or has more value?
- How do you know how many fractional parts make a whole?

### **STANDARDS ADDRESSED IN THIS UNIT**

**Mathematical standards are interwoven and should be addressed throughout the year in as many different units and activities as possible in order to emphasize the natural connections that exist among mathematical topics.**

### **KEY STANDARDS:**

**M2N4. Students will understand and compare common fractions with small denominators.**

- a. Model, identify, label, and compare fractions (thirds, sixths, eighths, tenths) as a representation of equal parts of a whole or of a set.
- b. Know that when all fractional parts are included, such as three thirds, the result is equal to the whole.

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### **RELATED STANDARDS:**

**M2N5. Students will represent and interpret quantities and relationships using mathematical expressions including equality and inequality signs ( $=$ ,  $<$ ,  $>$ ).**

- a. Include the use of boxes or \_\_\_ to represent a missing value.

**M2P1. Students will solve problems (using appropriate technology).**

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

**M2P2. Students will reason and evaluate mathematical arguments.**

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

**M2P3. Students will communicate mathematically.**

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

**M2P4. Students will make connections among mathematical ideas and to other disciplines.**

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

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### **M2P5. Students will represent mathematics in multiple ways.**

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

### **CONCEPTS/SKILLS TO MAINTAIN:**

**It is expected that students will have prior knowledge/experience related to the concepts and skills identified below. It may be necessary to pre-assess in order to determine if time needs to be spent on conceptual activities that help students develop a deeper understanding of these ideas.**

- Fluency with single digit addition/subtraction facts to 18
- Fair trades with coins or bills
- Duration and sequence of events
- Number patterns-skip count, odd/even
- Fact families
- Fractions.halves, fourths
- Tally marks
- Picture graphs
- Estimation.rounding to nearest ten

### **SELECTED TERMS AND SYMBOLS:**

**The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.**

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The definitions below are for teacher reference only and are not to be memorized by the students. Teachers should present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

**Denominator:** the bottom number of a fraction that tells how many equal parts are in a whole or set

**Numerator:** the top number of a fraction that tells how many of those equal parts (mentioned in the denominator) are being described

**Fraction:** A representation of part of a whole or part of a set

**Third:** one of three equal parts

**Sixth:** one of six equal parts

**Eighth:** one of eight equal parts

**Tenth:** one of ten equal parts

### **EVIDENCE OF LEARNING:**

**By the conclusion of this unit, students should be able to demonstrate the following competencies:**

- Identify and represent the fractional parts of a whole or of a set (halves, thirds, fourths, sixths, eighths, tenths).
- Recognize and represent that the denominator determines the number of equal sized pieces make up a whole.
- Recognize and represent that the numerator determines how many pieces of the whole are being referred to in the fraction.
- Represent and compare fractions with easy denominators using concrete and pictorial models.

**The following tasks represent the level of depth, rigor, and complexity expected of all second grade students. These tasks or a task of similar depth and rigor should be used to demonstrate evidence of learning.**

Making a Cake  
Fraction Snacks  
Finding Fractions  
Candy Bar Fractions  
Fantastic Fractions

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### **Culminating Activity:** “Fantastic Fractions”

Students represent and explain their understanding about a particular fraction.

### **STRATEGIES FOR TEACHING AND LEARNING:**

- Students should be actively engaged by developing their own understanding.
- Mathematics should be represented in as many ways as possible by using graphs, tables, pictures, symbols and words.
- Appropriate manipulatives and technology should be used to enhance student learning.
- Students should be given opportunities to revise their work based on teacher feedback, peer feedback, and metacognition which includes self-assessment and reflection.

### **Classroom Routines**

The importance of continuing the established classroom routines cannot be overstated. Daily routines must include such obvious activities such as taking attendance, doing a lunch count, determining how many items are needed for snack, lining up in a variety of ways (by height, age, type of shoe, hair color, eye color, etc.), daily questions and calendar activities. They should also include less obvious routines, such as how to select materials, how to use materials in a productive manner, how to put materials away, how to open and close a door, how to do just about everything! An additional routine is to allow plenty of time for children to explore new materials before attempting any directed activity with these new materials. The regular use of the routines are important to the development of students’ number sense, flexibility, and fluency, which will support students’ performances on the tasks in this unit. See unit 1 for suggestions concerning specific ideas for classroom routines.

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### TASKS:

The collection of the following tasks represents the level of depth, rigor and complexity expected of all second grade students to demonstrate evidence of learning.

- **Making a Cake**

#### **Making a Cake**

Imagine if you had a cake at your table and wanted to share the whole thing with the students at your table. How could you cut your cake to assure that each person had the same amount of cake? What fraction would each person get to eat? Use pictures, words, and numbers to explain your answers.

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#### ***Discussion, Suggestions, Possible Solutions***

*Begin by reading a book similar to Gator Pie written by Louise Mathews to the class. Use fraction circles to model sharing a pie with a small group of students in the class. (As an alternate, read the chapter about parts of a whole from Loreen Leedy's Fraction Action.)*

*Visit [pbskids.org/cyberchase/games/fractions/index.html](http://pbskids.org/cyberchase/games/fractions/index.html) to play "13 Ways to a Half".*

*Possible solutions include models of a cake in any shape (circle, square, rectangle, etc.) separated or cut into 6 equal parts. Each equal part is equal to one-sixth. Extensions include representing the cake in more than one shape and/or representing the same cake if more (or less) students were asked to share.*

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- **Fraction snacks**

### **Fraction snacks**

Robert opened his crackers at snack time and found that there were only 6 crackers in the bag. Some were circle shaped, and some were square shaped. What fraction of circle-shaped crackers and square-shaped crackers could Robert have? Use pictures, words, and numbers to explain your math thinking.

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#### ***Discussion, Suggestions, Possible Solutions***

*Review and discuss finding fractions of a set. Read the sections about fractions of a set from Fraction Action by Loreen Leedy or Fraction Fun by David Adler. Visit [www.learningmedia.co.nz/butterfly.swf](http://www.learningmedia.co.nz/butterfly.swf) to play an interactive game of capture butterflies and finding the fraction of the set of butterflies that you catch. Shake and spill a set of two color counters and practice finding fractions of a set.*

*This open-ended task allows for a number of possible solutions. Extended solutions should have more than one set of possible combinations. Students may draw each cracker or possibly assign each shape a key and use symbols to represent each set. Each set should be labeled with the correct fractions.*

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• **Finding Fractions**

**Finding Fractions**

Adapted from <http://illuminations.nctm.org/>, Fun With Fractions, Lesson 4

Choose a set of ten attribute blocks.  
Find as many fractions as possible from the set.  
Record and explain each fraction.

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***Discussion, Suggestions, Possible Solutions***

*Materials: attribute blocks (or an alternate material that contains a number of attributes), paper, pencil, crayons or markers*

*Begin by finding fractions about a set of students. Choose 6 students to stand in front of the class. Allow the class to generate as many fractions as possible about the set. (ex. One-sixth of the students is wearing jeans today. Five sixths of the students have jewelry on their wrists.)*

*Students may find fractions of the whole set of attribute blocks (ex. Three tenths of the fractions are hexagons.) They may find fractions of a set within the entire set of attribute blocks (ex. One half of the blue blocks have 4 corners.)*

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- **Candy Bar Fractions**

### Candy Bar Fractions

Mrs. Lake’s class earned a treat for excellent behavior. She told the students that they could choose to eat either three fourths of a candy bar or three eighths of a candy bar.

Which would you use? Use pictures, words, and numbers to explain your math thinking.

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#### *Discussion, Suggestions, Possible Solutions*

*Students that understand the meaning of a fraction – particularly the meanings of the numerator and denominator – will prove that 3 out of 4 equal parts (three fourths) is a larger portion than 3 out of 8 equal parts (three eighths). Students that are careful to represent two candy bars of the same size discretely prove their understanding of comparison. The language and symbols of comparison will be included in an explanation that clearly justifies the solution.*

- **Culminating Task**

This culminating task represents the level of depth, rigor and complexity expected of all second grade students to demonstrate evidence of learning.

### **Unit 5 Task: “Fantastic Fractions”**

Choose at least two fractions that you think are interesting.

Make a poster about the fractions.

Find as many ways as possible to represent the fractions.

Use pictures, words, and numbers to explain your math thinking about the fractions.

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### Suggestions for Classroom Use

While this task may serve as a summative assessment, it also may be used for teaching and learning. It is important that all elements of the task be addressed throughout the learning process so that students understand what is expected of them.

- Peer Review
- Display for parent night
- Place in portfolio
- Photographs

### Discussion, Suggestions and Possible Solutions

*Provide as many types of materials as possible. Allow students to choose which materials to include in their product. Some Suggested materials may include (but are not limited to): chart paper, poster board, construction paper, pencil, crayons, markers, scissors, glue, pattern blocks, tangrams, geoboards, geoboard paper, Cuisenaire rods, two color counters, attribute blocks, etc.*

*Begin by asking students what they know about fractions. Generating a Frayer diagram through whole class discourse will help to review fractions as well as organize their thoughts about fractions. Remind students of the math literature about fractions, the fraction websites, the fraction activities, and the fraction projects completed. Take a fraction walk around the classroom or school. Try to find fractions in the environment. Encourage students to include as much information about their fractions as possible when creating their posters.*

*Some teachers may feel more comfortable assigning the fractions rather than allowing the students to choose the two fractions.*

*Students should represent and compare their fractions via concrete and pictorial models. They should include information about the meaning of each fraction (including the meaning of the numerator and denominator). Creating a fraction power point presentation is an alternative product.*